(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 715 706 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
19.05.1999 Bulletin 1999/20

(21) Application number: **94920634.6**

(22) Date of filing: **01.07.1994**

(51) Int Cl.[6]: **F28D 19/04**

(86) International application number:
PCT/SE94/00658

(87) International publication number:
WO 95/01541 (12.01.1995 Gazette 1995/03)

(54) **REGENERATIVE HEAT EXCHANGER**

REGENERATIV-WÄRMETAUSCHER

ECHANGEUR THERMIQUE A REGENERATION

(84) Designated Contracting States:
AT BE DE DK ES FR GB IT SE

(30) Priority: **02.07.1993 SE 9302301**
10.02.1994 SE 9400441

(43) Date of publication of application:
12.06.1996 Bulletin 1996/24

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6 is hinged, and a corresponding fixed bottom sector plate 7 with a movable sector plate 8. The purpose of the two sector plates 5,6 and 7,8 is to sealingly bear as good as possible on the top and bottom ends of the rotor 2 and by that separate the heat exchanging media flowing through the rotor.

[0011] Each of the radially outer ends of the movable sector plates (6,8) are for that purpose provided with two units 10, which comprise a setting means 11 for maintaining a certain gap between the ends of the sector plates 6,8 and an annular top and bottom end flange 12 fixedly attached to the rotor 2 around its top and bottom peripheries. Moreover, each unit preferably comprises also a measuring device, not shown, suitably of fibre optic type, for control measurement of the gap.

[0012] Figure 3 illustrates a part of the housing structure 1 and the top end flange 12 of the rotor 2 and the movable top sector plate 6. One of the units 10 is fastened with screws in an aperture in the sector plate 6, which unit comprises an outer sleeve 15 with a mounting flange 16, that is fastened with screws 18 on the sector plate 6 with an intermediate sealing ring 17.

[0013] At the top of the sleeve 15 there is an interior thread 19, and an inner sleeve 20 is positioned in the sleeve 15 with an upper part, which is provided with an external thread 21 partially screwed on the thread 19. At the bottom the inner sleeve 20 is provided with a sealing 22, which is sealingly applied against the inner wall of the sleeve 15. the top end 23 of the inner sleeve is closed and its bottom end is provided with a bottom plate 24 welded to the outer sleeve. On the under side of the bottom plate a setting means in the shape of a circular sliding shoe is replaceably fastened by means of a countersunk fastening screw 26 threaded into the bottom plate and provided with an axial through channel 40 connecting the interior of the sleeve 20 with a recess 41 in the underside of the sliding shoe 25.

[0014] The mounting flange 16 of the outer sleeve 15 is provided with an axial flange 27 to which one end of an annular, slightly curved sealing bellow 28 is attached, the other end of which being attached to an axial sleeve 29 surrounding the unit 10 and positioned in a mounting hole in the housing structure 1 and attached to it by means of a mounting flange 30 and an intermediate sealing ring 31.

[0015] The top portion of the outer sleeve 15 is provided with a mounting lug 32 to which one end of a beam 33 is attached. The other end is in a corresponding way attached to the other unit 10 (not shown) supporting an end portion of a sector plate. According to the preferred embodiment a pressure cylinder 34 is attached to the housing structure 1, said pressure cylinder having a piston 35 and a piston rod 36 attached to the beam 33. A compression spring 37 is acting on the underside of the piston 35 and the pressure from a pressure gas conduit 38 is acting on the upper side of the piston. The conduit connects a pressure gas source (not shown) with a nipple 39 mounted in a through hole in the top portion of the top end 23 and provided with a channel to the interior of the sleeve 20 and a channel transmitting the pressure to the continuation of the conduit 38 to the cylinder 34. The weight of the sector plate 6 and associated equipment is mainly balanced by a balancing means (not shown) and the spring force from the spring 37. A bearing force of the sliding shoe 25 corresponding to a load of round 50 kg is created by a pressure of 2 bar in the sleeve 20 and in the cylinder 34 in combination with a suitable area of the piston 35. An air cushion is created on the underside of the sliding shoe 25 by the gas flowing out from the recess 41 such that the gap between the underside of the sliding shoe and the end flange 12 amounts to about 0.3 mm.

[0016] If the pressure in the conduit 38 should cease, the lifting force in the direction from the flange 12 also should cease together with the pressure force in the opposite direction from the piston 35 in the cylinder 34. Thereby and by the action of the spring 37 acting on the underside of the piston 35 the contact force of the sliding shoe 25 against the flange 12 will be sufficiently low to permit sliding of the sliding shoe on the flange 12 for a long time without damages and still with a reasonable sealing function of the sector plate till the break-down is repaired.

[0017] As previously mentioned the sliding shoes 25 and the cylinders 34 may be pressurized by two separate pressure gas sources. In this case cease of pressure to the sliding shoes should initiate a simultaneous cease of pressure to the pressure cylinders.

[0018] The gap between the sector plates 6 and the end flanges 12 is suitably as small as 1-3 mm. This is adjusted by turning of the upper portion 23 of the inner sleeve 20 by inserting a key into recesses in the upper portion 23 after loosening of a possible locknut which may be locked against the outer sleeve 15. A correct adjustment may be indicated for instance by the previously mentioned device of fibre optic type, which in the usual way may be arranged to control a motor-driven adjustment apparatus for turning the inner sleeve 20 and its top portion 23 as an alternative for the hand operated adjustment procedure, which of course cannot take place as frequent as a motor operated adjustment.

[0019] The invention is of course not restricted to the shown and described embodiment but may be modified in many ways without departing from the inventive idea defined by claim 1.

Claims

1. A regenerative heat exchanger comprising two main parts, one of which being rotatable relative to the other one around a common centre axis, wherein one part (2) is essentially cylindrical and contains a mass of heat regenerating material (3), and the other part (1) comprises ducts having axial inlet and outlet passages for the heat transmitting and heat

absorbing media, which inlet and outlet passages are separated from each other by sector shaped plates (6,8), which are positioned in sealing engagement with and closely adjacent to the ends of the cylindrical part, and which are hinged to axially fixed center plates (5,7) attached to the other part (1) at the ends of the cylindrical part, in addition to which the sector shaped plates (5,6) at one of the ends of the cylindrical part are axially in line with the plates (7,8) at the other end and at their radially outer end portions are provided with units (10), including means (25) for setting a gap between said end portions and an end flange (12) or similar means at each end of the cylindrical part, **characterized** in that the setting means (25) have end surfaces facing the corresponding end flange, which end surfaces are provided with recesses (40,41) communicating with a pressure gas source (38) for creating a pressure gas cushion between each setting means (25) and corresponding end flange (12).

2. A heat exchanger as claimed in claim 1, **characterized** in that the hinged sector plates (6,8) are influenced outwardly from the ends of the cylindrical part by resilient members (37) and/or balancing members and in the opposite direction by pressure medium operated push means (34,35), the pressure medium of which being arranged to cease in case of a breakdown of the pressure from the pressure gas source feeding the setting means (25).

3. A heat exchanger as claimed in claim 2, **characterized** in that the pressure gas source feeding the pressure gas cushions of said units (10) also is connected to said push means (34,35) including a piston (35) attached to the sector plates (6) and operated by the push means against the action of a compression spring (37) acting upon the piston.

Patentansprüche

1. Regenerativer Wärmetauscher mit zwei Hauptteilen, dessen eines relativ zu dem anderen um eine gemeinsame Mittelachse verdrehbar ist, wobei das eine Hauptteil (2) im wesentlichen zylindrisch ist und eine Masse aus wärme-regenerierendem Material (3) umschließt, und das andere Teil (1) Kanäle aufweist mit einem axialen Einlaß sowie mit Auslässen, für das wärmeübertragende und wärmeabsorbierende Medium, wobei der Einlaß und die Auslässe durch sektorförmige Platten (6, 8) voneinander getrennt sind, die ihrerseits gegeneinander abgedichtet, nahe bei den Enden der zylindrischen Teile angeordnet und angelenkt sind an axialfixierte Zentralplatten (5, 7), die ihrerseits am anderen Teil 1 an den Enden des zylindrischen Teiles befestigt sind, wobei außerdem die sektorförmigen Platten (5, 6) an einem der Enden des zylindrischen Teiles mit den Platten (7, 8) am anderen Ende fluchten, und an ihren radial-äußeren Endbereichen mit Einheiten (10) versehen sind, eingeschlossen Mittel (25) zum Einstellen eines Spaltes zwischen den genannten Endbereichen und einem Endflansch (12) oder ähnlichen Mitteln an jedem Ende des zylindrischen Teiles, dadurch gekennzeichnet, daß die Einstellmittel (25) Stirnflächen aufweisen, die dem entsprechenden Endflansch zugewandt sind und die mit Aussparungen (40, 41) versehen sind, welche ihrerseits mit einer Druckgasquelle (38) kommunizieren, um ein Druckgaspolster zwischen jedem Einstellmittel (25) und dem entsprechenden Endflansch (12) zu erzeugen.

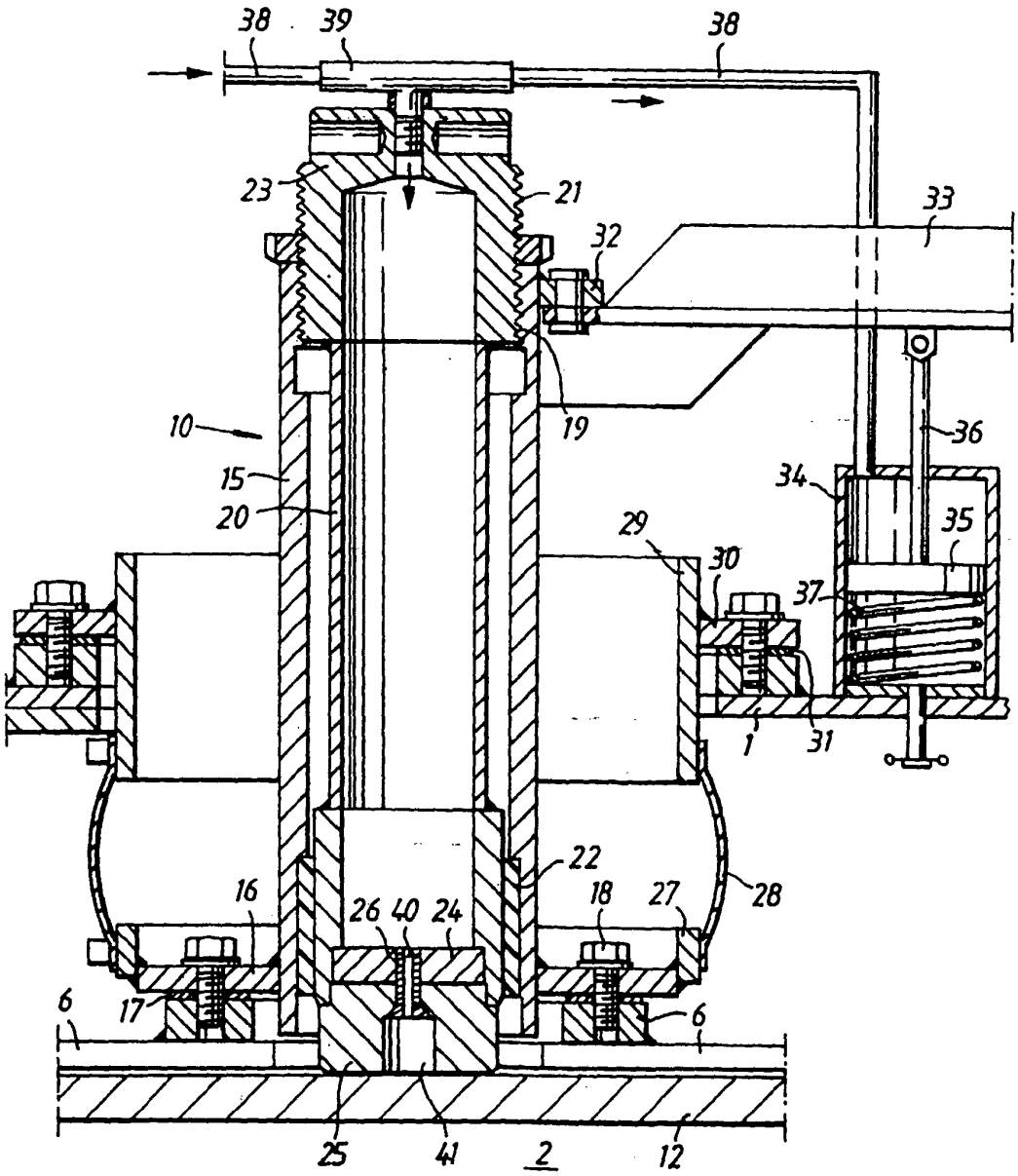
2. Wärmetauscher nach Anspruch 1, dadurch gekennzeichnet, daß die angelenkten sektorförmigen Platten (6, 8) von den Enden des zylindrischen Teiles in Richtung nach außen durch elastische Mittel (37) und/oder Ausgleichsmittel beaufschlagt sind, und in Gegenrichtung durch Schieber (34, 35), die von einem Druckmedium beaufschlagt sind, wobei der Mediumdruck derart gestaltet ist, daß er im Falle eines Zusammenbruches des Druckes der Druckgasquelle, die die Einstellmittel (25) beaufschlagt, ausfällt.

3. Wärmetauscher nach Anspruch 2, dadurch gekennzeichnet, daß die Druckgasquelle, die die Druckgaspolster der genannten Einheiten (10) beaufschlagt, auch an die Schieber (34, 35) angeschlossen ist, umfassend einen Kolben (35), der an den sektorförmigen Platten (6) angreift und durch die Schieber entgegen der Wirkung einer Druckfeder (37) betätigt wird, die auf den Kolben einwirkt.

Revendications

1. Echangeur de chaleur à régénération comprenant deux parties principales, dont l'une peut tourner par rapport à l'autre autour d'un axe central, et dans lequel une partie (2) est essentiellement cylindrique et contient une masse d'un matériau (3) régénérant de la chaleur, et l'autre partie (1) comprend des conduits possédant des passages axiaux d'entrée et de sortie pour les milieux de transmission de chaleur et d'absorption de chaleur, lesquels passages d'entrée et de sortie sont séparés les uns des autres par des plaques en forme de secteurs (6, 8), qui sont positionnées selon un engagement étanche et sont directement adjacents aux extrémités de la partie cylindrique et qui sont articulées à des plaques centrales axialement fixes (5, 7), fixées à l'autre partie (1) au niveau des extrémités de la partie cylindrique, et en outre dans lequel les plaques en forme de secteurs (5, 6) situées à l'une des extrémités de

Fig.3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